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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LUK, OLIVIA T

ART UNIT PAPER NUMBER

2812

DATE MAILED: 02/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/828,518

Applicant(s)

YOO, WOO SIK

Examiner

Olivia T Luk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 16-28 is/are pending in the application.
- 4a) Of the above claim(s) 8-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 16-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1 and 3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Carson (4,476,094).

In re claims 1, 17 and 24, Carson discloses introducing vapor-phase chemicals into a reactor with sufficiently supplied energy to cause a reaction in the reactor (col. 3, lines 50-55), exhausting gases from the reactor resulting from the reaction (col. 3, lines 65-68 and col. 4, lines 1-5), separating a second gas from the exhausted gases (col. 4, lines 4-10), purifying the second gas to generate a third gas (col. 7, lines 34-41 and col. 8, lines 1-6), and introducing the third gas into the reactor along with the vapor-phase chemicals including the first gas into the reactor with sufficient supplied energy to cause a second reaction in the reactor (col. 8, lines 15-25).

In re claims 3, 16 and 18, Carson discloses the first and third gas comprises H₂ (col. 3, line 52).

In re claim 4, Carson discloses the second gas comprises non-purified H₂ (col. 3, line 52).

In re claim 19, Carson discloses the vapor-phase chemicals comprise H₂ (col. 3, line 52).

In re claims 5, 20 and 25, Carson discloses the first gas comprises about 80% to 90% of the quantity of the H₂ introduced in the reactor (col. 3, lines 51-53).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carson (4,476,094) in view of Gadgil (5,284,519).

In re claim 2, Carson is applied *supra* but fails to teach the hydrogen recycle process with thin film deposition. Gadgil teaches thin film deposition in a chemical vapor reactor that uses gases that flow in and out discloses depositing a thin film layer on a substrate positioned in the reactor (col. 16, lines 21-42).

In re claims 6, 21 and 26, Carson is applied *supra*, but fails to teach the sufficient supplied energy comprises an RF low frequency power energy level of between about 0.318 watts/cm² to about 3.18 watts/cm². It would have been obvious to one having ordinary skill in the art at the time the invention was made to supply energy at this level, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In re claims 7, 22 and 27, Carson is applied *supra*, but fails to teach the reactor comprises a tapered outer shell surrounding a tapered susceptor. Gadgil teaches the tapered susceptor surrounded by a tapered outer shell. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a tapered shape

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because this shape is inherently stable and offers an important advantage of reduced particulate formation on the deposition surface and thus higher quality of the deposited film (col. 12, lines 10-15).

In re claims 23 and 28, Carson is applied *supra*, but fails to teach the vapor-phase chemicals comprises gases selected from the group consisting of NH₃, N₂O, SiF₄, SiH₄, TiCl₄, N₂, Ar, HCl, and SiCl₄. Gadgil teaches the vapor-phase chemicals comprise of gases selected from the group consisting of NH₃, N₂O, SiF₄, SiH₄ (col. 7, line 33). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use any one of these gases since they are well known in the art to be carrier gases in this type of semiconductor manufacturing.

Response to Arguments

4. Applicant's arguments filed 1/22/03 have been fully considered but they are not persuasive. The amendment to change the language of "first gas" to "second gas" does not effectively change the grounds of the original rejection. The Specification language does not read upon this specific language. Carson (4,476,094) does specifically recycle vapor-phase chemicals in a reaction chamber and purifies the gas, as argued by Applicant.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olivia T Luk whose telephone number is 703-305-3420. The examiner can normally be reached on 7AM to 4PM Mon-Fri.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 703-308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

OTL

January 29, 2003

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John F. Niebling
Supervisory Patent Examiner
Technology Center 2800